

# Autonomous Agents and Intelligent Assistants for Exploration Operations

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Human exploration of space will involve remote autonomous crew and systems in long missions. Data to earth will be delayed and limited. Earth control centers will not receive continuous real-time telemetry data, and there will be communication round trips of up to one hour. There will be reduced human monitoring on the planet and earth. When crews are present on the planet, they will be occupied with other activities, and system management will be a low priority task. Earth control centers will use multi-tasking "night shift" and on-call specialists. A new project at Johnson Space Center is developing software to support teamwork between distributed human and software agents in future interplanetary work environments. The Engineering and Mission Operations Directorates at Johnson Space Center (JSC) are combining laboratories and expertise to carry out this project, by establishing a testbed for human centered design, development and evaluation of intelligent autonomous and assistant systems. Intelligent autonomous systems for managing systems on planetary bases will communicate their knowledge to support distributed multi-agent mixed-initiative operations. Intelligent assistant agents will respond to events by developing briefings and responses according to instructions from human agents on earth and in space.